Commentary Article

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The Archaeological Impacts of Metal Detecting

<https://doi.org/10.1515/opar-2019-0013>

Received February 20, 2018; accepted March 4, 2019

Abstract: In a comment on two recent articles on the archaeological impacts of metal detecting, this paper advocates clearer and more valid measures of those impacts and more nuanced classification of the legal and cultural environments in which metal detecting takes place. The need to rely on open-source, online data for transnational analysis makes the former challenging but not impossible. Using the example of Canada, the paper shows that jurisdictional and other complexities make simple “permissive” and “restrictive/prohibitive” dichotomies unhelpful, and suggests using multivariate analysis that accounts for such factors as presumption of ownership, locations of metal detecting, availability of finds reporting, and whether heritage legislation concerns artifacts or only sites. This is essential for development of sound, evidence-based policy on the metal-detecting hobby.

Keywords: Metal detectors; Heritage policy; Canadian heritage

1 Introduction

An article in *Open Archaeology* by Deckers et al. (2018) critiques Hardy’s (2017) analysis of the impact of the metal-detecting hobby on archaeological resources in a number of mostly anglophone countries. Both articles, following in the wake of several others (e.g., Campbell, 2013; Deckers et al., 2016; Dobat & Jensen, 2016; Thomas, 2013), raise substantive issues regarding metal detecting, and particularly the importance of evidence-based policy for the restriction, regulation or permission of metal detecting. As important as the issues surrounding this topic are, these papers also make use of questionable assumptions and mathematics, and irregular uses of statistical terminology. My goal in what follows is to advocate clear presentation and analysis of reliable evidence for the impacts of metal detecting, rather than specifically to weigh in on Hardy’s conclusion that permissive regulatory environments have more negative impacts on cultural heritage than more restrictive ones.

2 Characterization of Hardy’s Measure of Cultural Damage

Deckers et al. (2018, p. 323) claim that Hardy uses a measure of “Cultural Damage” to compare territories with different regulatory regimes with regard to the use of metal detectors. I do not know if they were basing this claim on a version of the paper other than the one that is currently available publicly, but a careful search of Hardy (2017) yields no instance at all of the term, “cultural damage” and only rare and undefined uses of “criminal damage”. There are also several references to “cultural harm” and one to “legal harm,” again undefined.

More importantly, nowhere do we find the “formula” that Deckers et al. (2018, p. 323) say that Hardy uses, without citing their source:

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(number of licit detectorists x intensity of detecting x number of archaeologically valuable [‘reportable’] finds / proportion of unreported finds) + (number of illicit detectorists x intensity of detecting x number of finds) = cultural damage.

We might more clearly represent this as:

$$\text{Cultural damage} = \frac{ND_L I_L N_R}{N_{UL}} + D_I I_I N_{UI}$$

where D_L is the number of licit detectorists, I_L is their detection intensity, N_R is the number of reported finds (“reportable,” while repeating Hardy’s term, does not make sense given the next term), N_{UL} is the number of unreported finds by “licit” detectorists, N is the total of all finds by licit detectorists, D_I is the number of illicit detectorists, I_I is their detection intensity, and N_{UI} is the number of their finds (note: dividing by the proportion, N_{UL}/N , is the same as multiplying by N/N_{UL}). Presumably, $N = N_R + N_{UL}$, although it is not entirely clear that it is not $N_R + N_{UL} + N_{UI}$.

Even expressed more clearly, this formula does not make sense. First, Hardy is interested in “damage” or “harm” in the sense of the total number of unreported finds, which this expression does not yield. Hardy uses the estimated number of detectorists and their estimated intensity only in order to estimate how many finds they make, while the product $D_I I_I N_{UI}$ effectively squares this value (i.e., $D_I I_I = N_{UI}$, assuming illicit detectorists never report their finds), which would greatly exaggerate the “damage” and, in any case, is not what Hardy does. Even more oddly, dividing by the proportion of unreported finds has the surely unintended effect of indicating less damage when finds mainly went unreported and no damage at all when absolutely no finds were reported! For example, it leads to the nonsensical conclusion that damage by licit detectorists is 81 times higher when 10% of their finds go unreported than when 90% of their finds are unreported. Possibly Deckers et al. (2018) actually meant this term to be the proportion of reported finds. In other words, the two terms may have been accidentally reversed, but making that correction still does not make this expression yield what Hardy was measuring.

Possibly, what Deckers et al. meant to say, to paraphrase Hardy’s approach, was that cultural damage was the sum of all the illicit finds and all of the unreported finds by “licit” detectorists. This would be a much simpler formula that comes closer to what Hardy seems to present in his tables:

$$\text{Cultural damage} = N_{UI} + N_{UL} = D_I I_I + D_L I_L - N_R$$

In reality, Hardy (2017) goes to some length to estimate the number of licit and illicit detectorists in each territory, as well as their intensity (number of finds per hour, per day or per year) simply to arrive at estimates of the number of “reportable” and total finds per year. He also looks at the density of detectorists themselves (estimated number of detectorists by population and per km²), although the latter is based on countries’ total land areas and ignores the fact that detecting can be concentrated in small subsets of a country’s territory (e.g., in Canada, most detecting is in New Brunswick, Nova Scotia, Prince Edward Island, parts of Newfoundland, and southern British Columbia, Ontario and Quebec). Rather than the “cultural damage” statistic that Deckers et al. (2018) say he uses, Hardy actually ranks countries by estimated total number of metal-detector finds per year and “minimum average” number of “reportable” finds per year.

3 Hardy’s Terminological and Statistical Problems

Hardy’s (2017) paper would be easier to follow if it used standard statistical terminology. Throughout the paper, we see confusing terms like “minimum average” and “mean average”, often when he seems to mean, simply, the arithmetic mean (or “average”). In some of the tables (e.g., table 12), Hardy also uses “margin of error” without defining it; whatever it is, it is not coefficient of variation or standard error, and not clearly

any particular confidence interval or Bayesian credible interval. In any case, even where Hardy cites the standard deviation and “margin of error,” these do not appear to have been factors in analysis of the data.

Hardy had to grapple with the challenges of openly available data that often consisted of ranges, rather than means or medians. His approach to these, as in table 18 of the “minimum average hours of detecting per day”, was to calculate a “minimum average” that is simply the average of the low ends of these ranges. Thus, when four people surveyed estimated that, on average, they spent 1–2, 1.5–3, 2–4, and 1.5–4 hours per day, he would average the numbers 1, 1.5, 2 and 1.5 to yield a “minimum average” of 1.5. Arguably, this is a conservative approach, meant to avoid exaggerating the effect of metal detecting on the archaeological resource. Statistically speaking, it provides biased estimates, however, and it might have been more realistic to average the mid-points of these ranges, or calculate the median of these mid-points. For table 19, for example, rather than Hardy’s “minimum average” of 3.01 days of detecting per week, with a standard deviation of 2.04, using the average of the upper and lower ends of the ranges as data points gives 3.12 ± 2.06 . Admittedly, this is not very different but is less likely to be biased and easier to interpret.

4 “Licit” and “Illicit” Metal Detection

As Deckers et al. (2018) point out, Hardy’s assumptions about “permissive” vs. “restrictive” jurisdictions and “licit” vs. “illicit” detecting are too simplistic. Despite Hardy’s (2018b) attempt to dispute this characterization, these assumptions are also inaccurate.

For Canada (with which I am personally familiar), for example, Hardy (2017) assumes that all metal detecting that occurs is “illicit” because it is banned outright. This is not true. Hardy cites Denhez (2010) to support the claim that “in Canada, ‘all evidence of human occupation’ more than 75 years old — underwater or underground ... — is a protected archaeological resource.... In many places, the state automatically possesses any archaeological heritage on behalf of society.... Any even accidental find must be protected in situ.... and reported to the authorities.”

However, even his source, Denhez (2010), emphasizes that heritage resources that metal detectorists might encounter are usually under provincial, rather than federal, jurisdiction. The federal government is only responsible for heritage resources on federal lands and federally operated facilities, such as national parks, military bases, and harbour installations, where it is required to report accidental discoveries of artifacts (Parks Canada, 2005). There are also specific federal rules applicable to shipwreck sites, which are governed by the Canada Shipping Act (1985). With these federal exceptions, heritage rules vary from province to province and territory to territory, with further differences on First Nations reserves. Most of them make no specific reference to metal detectors. The provincial legislation to which Denhez refers also explicitly deals with artifacts found on “sites,” which are defined in various ways by the provinces and territories, and mainly concerns development contexts where licenced, private-sector archaeologists conduct archaeological assessments prior to construction projects that might damage known or undetected archaeological sites.

While most of the heritage regulations in Canada make no specific mention of metal detecting, it is true that many of them do restrict activities that might remove artifacts from sites under certain circumstances. In the Ontario Heritage Act, for example, section 48(1) says that “subject to subsection (2), no person shall carry out archaeological exploration, an archaeological survey or field work without a licence,” but the very next clause, 48(2) says that a “licence is not required for archaeological exploration, an archaeological survey or field work on property that is listed in the regulations” (Ontario, 1974, 1990a). This appears to refer to “designated property,” as defined in the Act, as section 56(1) says that “no person shall excavate or alter property designated under this Part or remove any object therefrom unless he ... receives a permit.” An “object,” is defined as any object of archaeological or historical significance, while a later regulation defines an “artifact” as “any object, material or substance that is made, modified, used, deposited or affected by human action and is of cultural heritage value or interest” (Ontario, 2004, p. 1). Section 66(2) of the Act indicates that “any object that is taken by a person who is not a licensee or by a licensee in contravention of his licence ... may be seized ... and deposited in such public institution as the Minister may

determine to be held in trust by the people of Ontario” (Ontario, 1990a), but the clause does not specify whether this is a universal rule or only applies on designated properties; its context implies the latter. Overall, the Ontario Heritage Act, like many of the comparable pieces of provincial legislation, deals with heritage properties, and is largely silent about artifacts. It is also noteworthy that the Province of Ontario also issues “avocational licences” in addition to professional and research licences (Ontario, 2006a). Such licences explicitly endorse the licensees’ stewardship of the collections they form. The Province of Manitoba also employs avocational archaeologists as regional advisors to members of the public who find artifacts (Manitoba, n.d.). While there are restrictions, they appear to apply, in the case of Ontario, only to “designated” sites for which permits are required. Manitoba, similarly, requires permits for the collection of “heritage objects” on archaeological sites or Crown land, but is silent about other situations (Manitoba, 2003). Quebec allows municipalities to decide whether permits are necessary to carry out archaeological investigations in zones of heritage interest, but requires permits for surveys and excavations otherwise (Quebec, 2012). Alberta requires finders to report all accidental finds of “historic resources,” and permits for excavation, but has provision for exemptions (Alberta, 2000).

The idea that the heritage rules concern all artifacts that are at least 75 years old is also incorrect. In southern Ontario, for example, the *Standards and Guidelines* specify that even sites, unless at least 80% of their occupation spans predate 1870 (i.e., are more than ~150 years old), can be ignored or destroyed unless they have some special significance or “cultural heritage value or interest” (OMTC, 2011, pp. 57–59), while the parallel provincial legislation only defines “cultural heritage value or interest” for properties, not individual artifacts (Ontario, 1990a, 2006b). Similarly, British Columbia’s legislation protects “sites” that predate 1846 (British Columbia, 1996). Manitoba, by contrast, goes as far as saying that “Heritage is not limited by age; a meaningful event from a few years ago may be significant to a community and merit commemoration or conservation” (Manitoba, n.d., 1–1).

The claim that the Crown “possesses” all archaeological artifacts is also misleading. In Ontario, for example, licenced archaeologists are “stewards” of artifacts on behalf of the people of Ontario. The Canadian provinces have few storage facilities, or even none at all, for cultural artifacts found in development contexts, let alone by metal detectorists and accidental finders, and most private-sector archaeological consulting firms have to curate collections themselves. In Ontario, the provincial standards only require consultants to report their “long-term curation plans” (OMTC, 2011, p. 98), while one regulation, since revoked, indicates that archaeological licence holders will “hold in safekeeping all artifacts and records of archaeological fieldwork carried out” under their licences (Ontario, 1990b, 6a). By some estimates, “some 20,000 boxes of artifacts ... languish in storage lockers, garages or the basements of archaeologists” in Ontario (Lorinc & Williamson, 2016). Only recently has there been an initiative to transfer many of these collections to facilities that two public universities established in London and Hamilton, Ontario. Not only is there no presumption that any artifacts belong to the Crown, a regulation of the Act that is now obsolete but still followed in practice indicates the exception “where the objects and records *are donated to Her Majesty the Queen in right of Ontario or are directed to be deposited in a public institution*” (Ontario, 1990b, 6a, italics added). “None of the above can be construed as a claim for crown ownership of artifacts” in Ontario (OAS, 2003), or most other jurisdictions (e.g., British Columbia, 1996). In Newfoundland, by contrast, “the property in all archaeological objects ... is vested in the Crown” (Newfoundland, 2001, c31, s9, 11(1)), illustrating how varied the situation can be in just one country. Manitoba also vests title of “heritage objects” in the Crown, yet permits them to remain in the custody of finders on Crown or municipal land and of owners on private land, except where the finder or owner “elects to give custody of the heritage object to the Crown” (Manitoba, 2003, 44(1)). New Brunswick vests ownership of all “archaeological, palaeontological and burial site heritage objects” in the Crown, except that objects of aboriginal origin are assumed to be “held in trust” for aboriginal communities (New Brunswick, 2010, p. 5(1–3)).

Furthermore, a search of recent online or newspaper articles about arrests of metal detectorists, which you would expect to be common if metal detecting were truly illegal across Canada but still practiced by more than 6,000 people, shows quite the opposite. I was only able to find one arrest of a Canadian metal detectorist in the last dozen years in these sources. This was a case in Brantford, Ontario, and the suspect was arrested only because he was practicing his hobby in a cemetery. Tellingly, he was not charged with

any violation of the Ontario Heritage Act, or even of the Cemeteries Act, but only with mischief, theft under \$5000 (it was actually 90 cents in small coins), and possession of stolen property (Gamble, 2008; Spectator, 2008). In another article, the City of Vernon, British Columbia, prohibited a metal detectorist from using his metal detector in its parks, not because the hobby is illegal, but because city officials were concerned about liability for tripping hazards (Kehler, 2017). Similarly, a recent article reported that the City of Windsor, Ontario, was pondering a new bylaw to restrict activities of metal detectorists because of damage to the turf in city parks and sports fields (Caton, 2018).

Of the other articles I was able to find, one reported with favour a detecting event with hundreds of participants, another Toronto's participation in National Metal Detecting Day (Explore, 2012), and a third the discovery of an English shilling of Edward VI on Vancouver Island (Stanton & Talmazan, 2014). In the last case, the Royal British Columbia Museum examined the coin and then returned it to the metal detectorist. Two articles described metal detectorists' discovery of unexploded mortar rounds, one in a public park in British Columbia (Canadian Press, 2014), and another in New Brunswick (CBC, 2016). Again, not one of these stories mentions that the users of metal detectors were in violation of heritage laws or any other laws. Even in Newfoundland, metal detectorists operate with no legal interference as long as they stay away from cemeteries, known archaeological sites and designated heritage sites.

Clearly, Hardy's characterization of Canada, at least, as a jurisdiction that prohibits metal detecting is not accurate. One suspects that his classification similarly over-simplifies the situation in other countries where multiple jurisdictions vary in their heritage policies. As Hardy has more recently acknowledged, the intersection of different laws and variations among jurisdictions and in enforcement from court to court in the United States complicates characterization of the heritage regime there and, specifically, where, whether, and from whom permits are required to use metal detectors (Hardy, 2018a). Arguably, the allegedly permissive England is not that different than the allegedly restrictive Canada, both having regimes based on British Common Law, except insofar as the former has formal reporting mechanisms like the Portable Antiquities Scheme (Paynton, 2008) and the latter generally does not (but Alberta, 2000). Determining the true impact of metal detecting on archaeological heritage in these or any other jurisdictions will require, not only more accurate data, but more nuanced distinctions than artificial licit/illicit and permissive/restrictive dichotomies.

5 Conclusions

The impact of the metal-detecting hobby on archaeological resources is an extremely important topic that deserves careful scrutiny. The article by Deckers et al. (2018), unfortunately, misrepresents some aspects of Hardy's (2017) article, particularly his methodology, while the latter makes a valiant attempt to draw as much information as possible from social media and online forums (see also Hardy, 2018a), yet also bases conclusions on analysis that suffers from some serious over-simplifications of heritage policy in at least some jurisdictions. I applaud Hardy's attempt to extract international data from online sources to help us evaluate these impacts yet, given my reservations about those data and the way they are analysed, I am skeptical of the conclusion that restrictive and prohibitive jurisdictions suffer less loss of archaeological evidence to metal detecting than do more permissive ones. Clearly, there is a need for thoughtful analysis of much better data on this issue (see also Thomas, 2016).

Hardy's attempts to estimate how many detectorists there are in various countries and the intensity of their activities are a good first step. However, some "ground-truthing" to evaluate the extent of biases that Deckers et al. plausibly expect to impact the data available online would be welcome. Possibly some conventional ethnography, rather than "netnography," in subsamples of the detecting populations would help to accomplish this. Hardy's (2018b) rebuttal that "there is no automatic reason to assume that such statistics are unrepresentative" just because some restrictive jurisdictions with poor enforcement yield high estimates is not reassuring. His analysis of estimates garnered from different sources — various online and social-media sources and "netnography" versus market data — illustrates some of the complexities and deals explicitly and more effectively with some of these biases (Hardy 2018a). It is also laudable that Hardy

heeds Thomas's (2016) call for a more transnational approach to the issues. However, it would be good to re-scale these estimates, in countries that have divided responsibility for heritage protection, to make it possible to associate detectorists better with the jurisdictions in which they mainly operate. Detector tourism, of course, will make this more difficult. It is also necessary to acknowledge that not all metal detectorists carry out their activities on archaeological sites, and to find ways to estimate the proportion that does.

A critical need is to eschew simple and misleading dichotomies and instead isolate various aspects of heritage management, and varying "styles" or "cultures" of metal detecting, that might affect rates of damage to archaeological resources. Among these factors, one might suggest: whether there is a presumption of ownership by finders, landowners, or government; whether reporting is required, encouraged, or unavailable; whether metal-detecting communities have codes of conduct with censure for non-compliance; whether restrictions on metal detecting or artifact removal are universal, or only apply to particular places, such as cemeteries or government property; whether the proportion of reported finds that fall within protected categories (e.g., pre-1849 artifacts in British Columbia) differs from the proportion of recent or unprotected finds and by how much; and whether heritage legislation and guidelines deal explicitly with artifacts or "finds," or only with "sites." There should also be distinctions between hobby detecting, commercial activities, and outright looting, and attention to how much detecting occurs on beaches and public parks or on archaeological sites and historic battlefields (cf. Thomas, 2016). As Hardy well knows, it will not be easy to tease out all these factors, and it will be necessary to estimate them as best we can, but multivariate analysis incorporating such nuances is likely to be more informative of the factors that contribute most to both the direct impacts of removing artifacts, and the related impacts of not reporting such removals.

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